Appl. No. 09/722,441; Group Art Unit: 1645
Dkt. No. 1533.1030002; Batch No.: To Be Assigned
Inventor(s): Hanke et al. ; Tel: 202/371-2600
Title: Increased Lysine Production by Gene Amplification

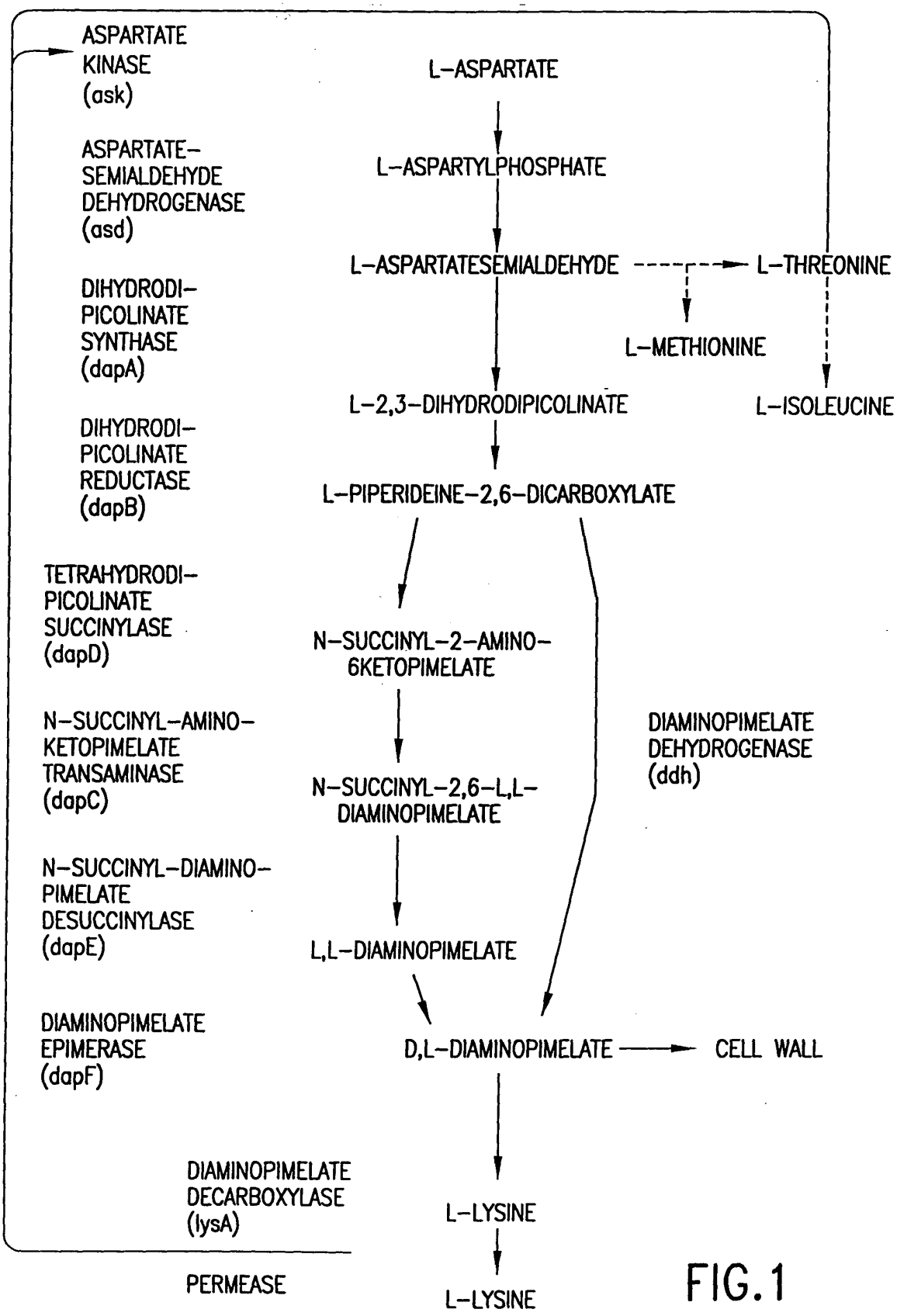

FIG.1

Appl. No. 09/722,441; Group Art Unit: 1645
Dkt. No. 1533.1030002; Batch No.: To Be Assigned
Inventor(s): Hanke et al. ; Tel: 202/371-2600
Title: Increased Lysine Production by Gene Amplification

Nucleotide sequence of ATCC21529 ask (SEQ ID NO:1)

```
   1  GTGGCCCTGG TCGTACAGAA ATATGGCGGT TCCTCGCTTG AGAGTGCGGA
  51  ACGCATTAGA AACGTCGCTG AACGGATCGT TGCCACCAAG AAGGCTGGAA
 101  ATGATGTCGT GGTTGTCTGC TCCGCAATGG GAGACACCAC GGATGAACTT
 151  CTAGAACTTG CAGCGGCAGT GAATCCCGTT CCGCCAGCTC GTGAAATGGA
 201  TATGCTCCTG ACTGCTGGTG AGCGTATTTC TAACGCTCTC GTCGCCATGG
 251  CTATTGAGTC CCTTGGCGCA GAAGCTCAAT CTTTCACTGG CTCTCAGGCT
 301  GGTGTGCTCA CCACCGAGCG CCACGGAAAC GCACGCATTG TTGACGTCAC
 351  ACCGGGTCGT GTGCGTGAAG CACTCGATGA GGGCAAGATC TGCATTGTTG
 401  CTGGTTTTCA GGGTGTTAAT AAAGAAACCC GCGATGTCAC CACGTTGGGT
 451  CGTGGTGGTT CTGACACCAC TGCAGTTGCG TTGGCAGCTG CTTTGAACGC
 501  TGATGTGTGT GAGATTTACT CGGACGTTGA CGGTGTGTAT ACCGCTGACC
 551  CGCGCATCGT TCCTAATGCA CAGAAGCTGG AAAAGCTCAG CTTCGAAGAA
 601  ATGCTGGAAC TTGCTGCTGT TGGCTCCAAG ATTTTGGTGC TGCGCAGTGT
 651  TGAATACGCT CGTGCATTCA ATGTGCCACT TCGCGTACGC TCGTCTTATA
 701  GTAATGATCC CGGCACTTTG ATTGCCGGCT CTATGGAGGA TATTCCTGTG
 751  GAAGAAGCAG TCCTTACCGG TGTCGCAACC GACAAGTCCG AAGCCAAAGT
 801  AACCGTTCTG GGTATTTCCG ATAAGCCAGG CGAGGCTGCC AAGGTTTTCC
 851  GTGCGTTGGC TGATGCAGAA ATCAACATTG ACATGGTTCT GCAGAAcgtc
 901  tcctctgtGG AAGACGGCAC CACCGACATC ACGTTCACCT GCCCTCGCGC
 951  TGACGGACGC CGTGCGATGG AGATCTTGAA GAAGCTTCAG GTTCAGGGCA
1001  ACTGGACCAA TGTGCTTTAC GACGACCAGG TCGGCAAAGT CTCCCTCGTG
1051  GGTGCTGGCA TGAAGTCTCA CCCAGGTGTT ACCGCAGAGT TCATGGAAGC
1101  TCTGCGCGAT GTCAACGTGA ACATCGAATT GATTTCCATC TCTGAGATCC
1151  GCATTTCCGT GCTGATCCGT GAAGATGATC TGGATGCTGC TGCACGTGCA
1201  TTGCATGAGC AGTTCCAGCT GGGCGGCGAA GACGAAGCCG TCGTTTATGC
1251  AGGCACCGGA CGCTAA
```

FIG. 2

Appl. No. 09/722,441; Group Art Unit: 1645
Dkt. No. 1533.1030002; Batch No.: To Be Assigned
Inventor(s): Hanke et al. ; Tel: 202/371-2600
Title: Increased Lysine Production by Gene Amplification

Amino Acid Sequence of ATTC21529 ask (SEQ ID NO:2)

```
                GTGGCCCTGGTCGTACAGAAATATGGCGGTTCCTCGCTTGAGAGTGCGGAACGCATTAGA
  1 ---------+---------+---------+---------+---------+---------+---------+ 60
                M  A  L  V  V  Q  K  Y  G  G  S  S  L  E  S  A  E  R  I  R

                AACGTCGCTGAACGGATCGTTGCCACCAAGAAGGCTGGAAATGATGTCGTGGTTGTCTGC
 61 ---------+---------+---------+---------+---------+---------+---------+ 120
                N  V  A  E  R  I  V  A  T  K  K  A  G  N  D  V  V  V  V  C

                TCCGCAATGGGAGACACCACGGATGAACTTCTAGAACTTGCAGCGGCAGTGAATCCCGTT
121 ---------+---------+---------+---------+---------+---------+---------+ 180
                S  A  M  G  D  T  T  D  E  L  L  E  L  A  A  A  V  N  P  V

                CCGCCAGCTCGTGAAATGGATATGCTCCTGACTGCTGGTGAGCGTATTTCTAACGCTCTC
181 ---------+---------+---------+---------+---------+---------+---------+ 240
                P  P  A  R  E  M  D  M  L  L  T  A  G  E  R  I  S  N  A  L

                GTCGCCATGGCTATTGAGTCCCTTGGCGCAGAAGCTCAATCTTTCACTGGCTCTCAGGCT
241 ---------+---------+---------+---------+---------+---------+---------+ 300
                V  A  M  A  I  E  S  L  G  A  E  A  Q  S  F  T  G  S  Q  A

                GGTGTGCTCACCACCGAGCGCCACGGAAACGCACGCATTGTTGACGTCACACCGGGTCGT
301 ---------+---------+---------+---------+---------+---------+---------+ 360
                G  V  L  T  T  E  R  H  G  N  A  R  I  V  D  V  T  P  G  R

                GTGCGTGAAGCACTCGATGAGGGCAAGATCTGCATTGTTGCTGGTTTTCAGGGTGTTAAT
361 ---------+---------+---------+---------+---------+---------+---------+ 420
                V  R  E  A  L  D  E  G  K  I  C  I  V  A  G  F  Q  G  V  N

                AAAGAAACCCGCGATGTCACCACGTTGGGTCGTGGTGGTTCTGACACCACTGCAGTTGCG
421 ---------+---------+---------+---------+---------+---------+---------+ 480
                K  E  T  R  D  V  T  T  L  G  R  G  G  S  D  T  T  A  V  A

                TTGGCAGCTGCTTTGAACGCTGATGTGTGTGAGATTTACTCGGACGTTGACGGTGTGTAT
481 ---------+---------+---------+---------+---------+---------+---------+ 540
                L  A  A  A  L  N  A  D  V  C  E  I  Y  S  D  V  D  G  V  Y

                ACCGCTGACCCGCGCATCGTTCCTAATGCACAGAAGCTGGAAAAGCTCAGCTTCGAAGAA
541 ---------+---------+---------+---------+---------+---------+---------+ 600
                T  A  D  P  R  I  V  P  N  A  Q  K  L  E  K  L  S  F  E  E

                ATGCTGGAACTTGCTGCTGTTGGCTCCAAGATTTTGGTGCTGCGCAGTGTTGAATACGCT
601 ---------+---------+---------+---------+---------+---------+---------+ 660
                M  L  E  L  A  A  V  G  S  K  I  L  V  L  R  S  V  E  Y  A
```

FIG.3A

Appl. No. 09/722,441; Group Art Unit: 1645
Dkt. No. 1533.1030002; Batch No.: To Be Assigned
Inventor(s): Hanke et al. ; Tel: 202/371-2600
Title: Increased Lysine Production by Gene Amplification

```
    CGTGCATTCAATGTGCCACTTCGCGTACGCTCGTCTTATAGTAATGATCCCGGCACTTTG
661 ---------+---------+---------+---------+---------+---------+ 720

    R  A  F  N  V  P  L  R  V  R  S  S  Y  S  N  D  P  G  T  L

    ATTGCCGGCTCTATGGAGGATATTCCTGTGGAAGAAGCAGTCCTTACCGGTGTCGCAACC
721 ---------+---------+---------+---------+---------+---------+ 780

    I  A  G  S  M  E  D  I  P  V  E  E  A  V  L  T  G  V  A  T

    GACAAGTCCGAAGCCAAAGTAACCGTTCTGGGTATTTCCGATAAGCCAGGCGAGGCTGCC
781 ---------+---------+---------+---------+---------+---------+ 840

    D  K  S  E  A  K  V  T  V  L  G  I  S  D  K  P  G  E  A  A

    AAGGTTTTCCGTGCGTTGGCTGATGCAGAAATCAACATTGACATGGTTCTGCAGAAcgtc
841 ---------+---------+---------+---------+---------+---------+ 900

    K  V  F  R  A  L  A  D  A  E  I  N  I  D  M  V  L  Q  N  V

    tcctctgtGGAAGACGGCACCACCGACATCACGTTCACCTGCCCTCGCGCTGACGGACGC
901 ---------+---------+---------+---------+---------+---------+ 960

    S  S  V  E  D  G  T  T  D  I  T  F  T  C  P  R  A  D  G  R

    CGTGCGATGGAGATCTTGAAGAAGCTTCAGGTTCAGGGCAACTGGACCAATGTGCTTTAC
961 ---------+---------+---------+---------+---------+---------+ 1020

    R  A  M  E  I  L  K  K  L  Q  V  Q  G  N  W  T  N  V  L  Y

    GACGACCAGGTCGGCAAAGTCTCCCTCGTGGGTGCTGGCATGAAGTCTCACCCAGGTGTT
1021 ---------+---------+---------+---------+---------+---------+ 1080

    D  D  Q  V  G  K  V  S  L  V  G  A  G  M  K  S  H  P  G  V

    ACCGCAGAGTTCATGGAAGCTCTGCGCGATGTCAACGTGAACATCGAATTGATTTCCATC
1081 ---------+---------+---------+---------+---------+---------+ 1140

    T  A  E  F  M  E  A  L  R  D  V  N  V  N  I  E  L  I  S  I

    TCTGAGATCCGCATTTCCGTGCTGATCCGTGAAGATGATCTGGATGCTGCTGCACGTGCA
1141 ---------+---------+---------+---------+---------+---------+ 1200

    S  E  I  R  I  S  V  L  I  R  E  D  D  L  D  A  A  A  R  A

    TTGCATGAGCAGTTCCAGCTGGGCGGCGAAGACGAAGCCGTCGTTTATGCAGGCACCGGA
1201 ---------+---------+---------+---------+---------+---------+ 1260

    L  H  E  Q  F  Q  L  G  G  E  D  E  A  V  V  Y  A  G  T  G

    CGCTAA
1261 ------ 1266

    R  *
```

FIG.3B

Appl. No. 09/722,441; Group Art Unit: 1645
Dkt. No. 1533.1030002; Batch No.: To Be Assigned
Inventor(s): Hanke et al. ; Tel: 202/371-2600
Title: Increased Lysine Production by Gene Amplification

Nucleotide sequence of ATCC21529 asd (SEQ ID NO:3)

```
   1  ATGACCACCA TCGCAGTTGT TGGTGCAACC GGCCAGGTCG GCCAGGTTAT
  51  GCGCACCTTT TTGGAAGAGC GCAATTTCCC AGCTGACACT GTTCGTTTCT
 101  TTGCTTCCCC GCGTTCCGCA GGCCGTAAGA TTGAATTCCG TGGCACGGAA
 151  ATCGAGGTAG AAGACATTAC TCAGGCAACC GAGGAGTCCC TCAAGGGCAT
 201  CGACGTTGCG TTGTTCTCTG CTGGAGGCAC CGCTTCCAAG CAGTACGCTC
 251  CACTGTTTGC TGCTGCAGGC GCGACTGTTG TGGATAACTC TTCTGCTTGG
 301  CGCAAGGACG ACGAGGTTCC ACTAATCGTC TCTGAGGTGA ACCCTTCCGA
 351  CAAGGATTCC CTGGTCAAGG GCATTATTGC GAATCCTAAC TGCACCACCA
 401  TGGCTGCAAT GCCAGTGCTG AAGCCACTGC ACGATGCCGC TGGTCTTGTA
 451  AAGCTTCACG TTTCCTCTTA CCAGGCTGTT TCCGGTTCTG GTCTTGCAGG
 501  TGTGGAAACC TTGGCAAAGC AGGTTGCTGC AGTTGGCGAC CACAACGTTG
 551  AGTTCGTCCA TGATGGACAG GCTGCTGACG CAGGCGATGT CGGACCTTAC
 601  GTTTCCCCAA TCGCTTACAA CGTGCTGCCA TTCGCCGGAA ACCTCGTCGA
 651  TGACGGCACC TTCGAAACCG ACGAAGAGCA GAAGCTGCGC AACGAATCCC
 701  GCAAGATTCT CGGCCTCCCA GACCTCAAGG TCTCAGGCAC CTGCGTCCGC
 751  GTGCCGGTTT TCACCGGCCA CACGCTGACC ATTCACGCCG AATTCGACAA
 801  GGCAATCACC GTCGAGCAGG CGCAGGAGAT CTTGGGTGCC GCTTCAGGCG
 851  TCGAGCTTGT CGACGTCCCA ACCCCACTTG CAGCTGCCGG CATTGACGAA
 901  TCCCTCGTTG GACGCATCCG TCAGGACTCC ACTGTCGACG ACAACCGCGG
 951  TCTGGTTCTC GTCGTATCTG GCGATAACCT TCGCAAGGGC GCAGCACTGA
1001  ACACCATTCA GATTGCTGAG CTGCTGGTTA AGTAA
```

FIG. 4

Appl. No. 09/722,441; Group Art Unit: 1645
Dkt. No. 1533.1030002; Batch No.: To Be Assigned
Inventor(s): Hanke et al. ; Tel: 202/371-2600
Title: Increased Lysine Production by Gene Amplification

Amino acid sequence of ATCC21529 asd (SEQ ID NO:4)

```
   ATGACCACCATCGCAGTTGTTGGTGCAACCGGCCAGGTCGGCCAGGTTATGCGCACCTTT
 1 ---------+---------+---------+---------+---------+---------+ 60

   M  T  T  I  A  V  V  G  A  T  G  Q  V  G  Q  V  M  R  T  F

   TTGGAAGAGCGCAATTTCCCAGCTGACACTGTTCGTTTCTTTGCTTCCCCGCGTTCCGCA
61 ---------+---------+---------+---------+---------+---------+ 120

   L  E  E  R  N  F  P  A  D  T  V  R  F  F  A  S  P  R  S  A

   GGCCGTAAGATTGAATTCCGTGGCACGGAAATCGAGGTAGAAGACATTACTCAGGCAACC
121 ---------+---------+---------+---------+---------+---------+ 180

   G  R  K  I  E  F  R  G  T  E  I  E  V  E  D  I  T  Q  A  T

   GAGGAGTCCCTCAAGGGCATCGACGTTGCGTTGTTCTCTGCTGGAGGCACCGCTTCCAAG
181 ---------+---------+---------+---------+---------+---------+ 240

   E  E  S  L  K  G  I  D  V  A  L  F  S  A  G  G  T  A  S  K

   CAGTACGCTCCACTGTTTGCTGCTGCAGGCGCGACTGTTGTGGATAACTCTTCTGCTTGG
241 ---------+---------+---------+---------+---------+---------+ 300

   Q  Y  A  P  L  F  A  A  A  G  A  T  V  V  D  N  S  S  A  W

   CGCAAGGACGACGAGGTTCCACTAATCGTCTCTGAGGTGAACCCTTCCGACAAGGATTCC
301 ---------+---------+---------+---------+---------+---------+ 360

   R  K  D  D  E  V  P  L  I  V  S  E  V  N  P  S  D  K  D  S

   CTGGTCAAGGGCATTATTGCGAATCCTAACTGCACCACCATGGCTGCAATGCCAGTGCTG
361 ---------+---------+---------+---------+---------+---------+ 420

   L  V  K  G  I  I  A  N  P  N  C  T  T  M  A  A  M  P  V  L

   AAGCCACTGCACGATGCCGCTGGTCTTGTAAAGCTTCACGTTTCCTCTTACCAGGCTGTT
421 ---------+---------+---------+---------+---------+---------+ 480

   K  P  L  H  D  A  A  G  L  V  K  L  H  V  S  S  Y  Q  A  V

   TCCGGTTCTGGTCTTGCAGGTGTGGAAACCTTGGCAAAGCAGGTTGCTGCAGTTGGCGAC
481 ---------+---------+---------+---------+---------+---------+ 540

   S  G  S  G  L  A  G  V  E  T  L  A  K  Q  V  A  A  V  G  D
```

FIG.5A

Appl. No. 09/722,441; Group Art Unit: 1645
Dkt. No. 1533.1030002; Batch No.: To Be Assigned
Inventor(s): Hanke et al. ; Tel: 202/371-2600
Title: Increased Lysine Production by Gene Amplification

```
    CACAACGTTGAGTTCGTCCATGATGGACAGGCTGCTGACGCAGGCGATGTCGGACCTTAC
541 ---------+---------+---------+---------+---------+---------+ 600

    H  N  V  E  F  V  H  D  G  Q  A  A  D  A  G  D  V  G  P  Y

    GTTTCCCCAATCGCTTACAACGTGCTGCCATTCGCCGGAAACCTCGTCGATGACGGCACC
601 ---------+---------+---------+---------+---------+---------+ 660

    V  S  P  I  A  Y  N  V  L  P  F  A  G  N  L  V  D  D  G  T

    TTCGAAACCGACGAAGAGCAGAAGCTGCGCAACGAATCCCGCAAGATTCTCGGCCTCCCA
661 ---------+---------+---------+---------+---------+---------+ 720

    F  E  T  D  E  E  Q  K  L  R  N  E  S  R  K  I  L  G  L  P

    GACCTCAAGGTCTCAGGCACCTGCGTCCGCGTGCCGGTTTTCACCGGCCACACGCTGACC
721 ---------+---------+---------+---------+---------+---------+ 780

    D  L  K  V  S  G  T  C  V  R  V  P  V  F  T  G  H  T  L  T

    ATTCACGCCGAATTCGACAAGGCAATCACCGTCGAGCAGGCGCAGGAGATCTTGGGTGCC
781 ---------+---------+---------+---------+---------+---------+ 840

    I  H  A  E  F  D  K  A  I  T  V  E  Q  A  Q  E  I  L  G  A

    GCTTCAGGCGTCGAGCTTGTCGACGTCCCAACCCCACTTGCAGCTGCCGGCATTGACGAA
841 ---------+---------+---------+---------+---------+---------+ 900

    A  S  G  V  E  L  V  D  V  P  T  P  L  A  A  A  G  I  D  E

    TCCCTCGTTGGACGCATCCGTCAGGACTCCACTGTCGACGACAACCGCGGTCTGGTTCTC
901 ---------+---------+---------+---------+---------+---------+ 960

    S  L  V  G  R  I  R  Q  D  S  T  V  D  D  N  R  G  L  V  L

    GTCGTATCTGGCGATAACCTTCGCAAGGGCGCAGCACTGAACACCATTCAGATTGCTGAG
961 ---------+---------+---------+---------+---------+---------+ 1020

    V  V  S  G  D  N  L  R  K  G  A  A  L  N  T  I  Q  I  A  E

    CTGCTGGTTAAGTAA
1021 ---------+----- 1035

    L  L  V  K  *
```

FIG.5B

Appl. No. 09/722,441; Group Art Unit: 1645
Dkt. No. 1533.1030002; Batch No.: To Be Assigned
Inventor(s): Hanke et al. ; Tel: 202/371-2600
Title: Increased Lysine Production by Gene Amplification

Nucleotide sequence of dapA (SEQ ID NO:5)

```
  1  ATGAGCACAG GTTTAACAGC TAAGACCGGA GTAGAGCACT TCGGCACCGT
 51  TGGAGTAGCA ATGGTTACTC CATTCACGGA ATCCGGAGAC ATCGATATCG
101  CTGCTGGCCG CGAAGTCGCG GCTTATTTGG TTGATAAGGG CTTGGATTCT
151  TTGGTTCTCG CGGGCACCAC TGGTGAATCC CCAACGACAA CCGCCGCTGA
201  AAAACTAGAA CTGCTCAAGG CCGTTCGTGA GGAAGTTGGG GATCGGGCGA
251  AGCTCATCGC CGGTGTCGGA ACCAACAACA CGCGGACATC TGTGGAACTT
301  GCGGAAGCTG CTGCTTCTGC TGGCGCAGAC GGCCTTTTAG TTGTAACTCC
351  TTATTACTCC AAGCCGAGCC AAGAGGGATT GCTGGCGCAC TTCGGTGCAA
401  TTGCTGCAGC AACAGAGGTT CCAATTTGTC TCTATGACAT TCCTGGTCGG
451  TCAGGTATTC CAATTGAATC TGATACCATG AGACGCCTGA GTGAATTACC
501  TACGATTTTG GCGGTCAAGG ACGCCAAGGG TGACCTCGTT GCAGCCACGT
551  CATTGATCAA AGAAACGGGA CTTGCCTGGT ATTCAGGCGA TGACCCACTA
601  AACCTTGTTT GGCTTGCTTT GGGCGGATCA GGTTTCATTT CCGTAATTGG
651  ACATGCAGCC CCCACAGCAT TACGTGAGTT GTACACAAGC TTCGAGGAAG
701  GCGACCTCGT CCGTGCGCGG GAAATCAACG CCAAACTATC ACCGCTGGTA
751  GCTGCCCAAG GTCGCTTGGG TGGAGTCAGC TTGGCAAAAG CTGCTcTGCG
801  TCTGCAGGGC ATCAACGTAG GAGATCCTCG ACTTCCAATT ATGGCTCCAA
851  ATGAGCAGGA ACTTGAGGCT CTCCGAGAAG ACATGAAAAA AGCTGGAGTT
901  CTATAA
```

FIG. 6

Appl. No. 09/722,441; Group Art Unit: 1645
Dkt. No. 1533.1030002; Batch No.: To Be Assigned
Inventor(s): Hanke et al. ; Tel: 202/371-2600
Title: Increased Lysine Production by Gene Amplification

Amino acid sequence of dapA (SEQ ID NO:6)

```
   ATGAGCACAGGTTTAACAGCTAAGACCGGAGTAGAGCACTTCGGCACCGTTGGAGTAGCA
 1 ---------+---------+---------+---------+---------+---------+ 60

   M  S  T  G  L  T  A  K  T  G  V  E  H  F  G  T  V  G  V  A

   ATGGTTACTCCATTCACGGAATCCGGAGACATCGATATCGCTGCTGGCCGCGAAGTCGCG
61 ---------+---------+---------+---------+---------+---------+ 120

   M  V  T  P  F  T  E  S  G  D  I  D  I  A  A  G  R  E  V  A

   GCTTATTTGGTTGATAAGGGCTTGGATTCTTTGGTTCTCGCGGGCACCACTGGTGAATCC
121 ---------+---------+---------+---------+---------+---------+ 180

   A  Y  L  V  D  K  G  L  D  S  L  V  L  A  G  T  T  G  E  S

   CCAACGACAACCGCCGCTGAAAAACTAGAACTGCTCAAGGCCGTTCGTGAGGAAGTTGGG
181 ---------+---------+---------+---------+---------+---------+ 240

   P  T  T  T  A  A  E  K  L  E  L  L  K  A  V  R  E  E  V  G

   GATCGGGCGAAGCTCATCGCCGGTGTCGGAACCAACAACACGCGGACATCTGTGGAACTT
241 ---------+---------+---------+---------+---------+---------+ 300

   D  R  A  K  L  I  A  G  V  G  T  N  N  T  R  T  S  V  E  L

   GCGGAAGCTGCTGCTTCTGCTGGCGCAGACGGCCTTTTAGTTGTAACTCCTTATTACTCC
301 ---------+---------+---------+---------+---------+---------+ 360

   A  E  A  A  A  S  A  G  A  D  G  L  L  V  V  T  P  Y  Y  S

   AAGCCGAGCCAAGAGGGATTGCTGGCGCACTTCGGTGCAATTGCTGCAGCAACAGAGGTT
361 ---------+---------+---------+---------+---------+---------+ 420

   K  P  S  Q  E  G  L  L  A  H  F  G  A  I  A  A  A  T  E  V

   CCAATTTGTCTCTATGACATTCCTGGTCGGTCAGGTATTCCAATTGAATCTGATACCATG
421 ---------+---------+---------+---------+---------+---------+ 480

   P  I  C  L  Y  D  I  P  G  R  S  G  I  P  I  E  S  D  T  M
```

FIG.7A

Appl. No. 09/722,441; Group Art Unit: 1645
Dkt. No. 1533.1030002; Batch No.: To Be Assigned
Inventor(s): Hanke et al. ; Tel: 202/371-2600
Title: Increased Lysine Production by Gene Amplification

```
    AGACGCCTGAGTGAATTACCTACGATTTTGGCGGTCAAGGACGCCAAGGGTGACCTCGTT
481 ---------+---------+---------+---------+---------+---------+ 540

    R  R  L  S  E  L  P  T  I  L  A  V  K  D  A  K  G  D  L  V

    GCAGCCACGTCATTGATCAAAGAAACGGGACTTGCCTGGTATTCAGGCGATGACCCACTA
541 ---------+---------+---------+---------+---------+---------+ 600

    A  A  T  S  L  I  K  E  T  G  L  A  W  Y  S  G  D  D  P  L

    AACCTTGTTTGGCTTGCTTTGGGCGGATCAGGTTTCATTTCCGTAATTGGACATGCAGCC
601 ---------+---------+---------+---------+---------+---------+ 660

    N  L  V  W  L  A  L  G  G  S  G  F  I  S  V  I  G  H  A  A

    CCCACAGCATTACGTGAGTTGTACACAAGCTTCGAGGAAGGCGACCTCGTCCGTGCGCGG
661 ---------+---------+---------+---------+---------+---------+ 720

    P  T  A  L  R  E  L  Y  T  S  F  E  E  G  D  L  V  R  A  R

    GAAATCAACGCCAAACTATCACCGCTGGTAGCTGCCCAAGGTCGCTTGGGTGGAGTCAGC
721 ---------+---------+---------+---------+---------+---------+ 780

    E  I  N  A  K  L  S  P  L  V  A  A  Q  G  R  L  G  G  V  S

    TTGGCAAAAGCTGCTctGCGTCTGCAGGGCATCAACGTAGGAGATCCTCGACTTCCAATT
781 ---------+---------+---------+---------+---------+---------+ 840

    L  A  K  A  A  L  R  L  Q  G  I  N  V  G  D  P  R  L  P  I

    ATGGCTCCAAATGAGCAGGAACTTGAGGCTCTCCGAGAAGACATGAAAAAAGCTGGAGTT
841 ---------+---------+---------+---------+---------+---------+ 900

    M  A  P  N  E  Q  E  L  E  A  L  R  E  D  M  K  K  A  G  V

    CTATAA
901 ------ 906

    L  *  -
```

FIG. 7B

Appl. No. 09/722,441; Group Art Unit: 1645
Dkt. No. 1533.1030002; Batch No.: To Be Assigned
Inventor(s): Hanke et al. ; Tel: 202/371-2600
Title: Increased Lysine Production by Gene Amplification

Nucleotide sequence of dapB (SEQ ID NO:7)

```
  1  ATGGGAATCA AGGTTGGCGT TCTCGGAGCC AAAGGCCGTG TTGGTCAAAC
 51  TATTGTGGCA GCAGTCAATG AGTCCGACGA TCTGGAGCTT GTTGCAGAGA
101  TCGGCGTCGA CGATGATTTG AGCCTTCTGG TAGACAACGG CGCTGAAGTT
151  GTCGTTGACT TCACCACTCC TAACGCTGTG ATGGGCAACC TGGAGTTCTG
201  CATCAACAAC GGCATTTCTG CGGTTGTTGG AACCACGGGC TTCGATaATG
251  CTCGTTTGGA GCAGGTTCGC GcCTGGCTTG AAGGAAAAGA CAATGTCGGT
301  GTTCTGATCG CACCTAACTT TGCTATCTCT GCGGTGTTGA CCATGGTCTT
351  TTCCAAGCAG GCTGCCCGCT TCTTCGAATC AGCTGAAGTT ATTGAGCTGC
401  ACCACCCCAA CAAGCTGGAT GCACCTTCAG GCACCGCGAT CCACACTGCT
451  CAGGGCATTG CTGCGGCACG CAAAGAAGCA GGCATGGACG CACAGCCAGA
501  TGCGACCGAG CAGGCACTTG AGGGTTCCCG TGGCGCAAGC GTAGATGGAA
551  TCCCaGTTCA cGCAGTCCGC ATGTCCGGCA TGGTTGCTCA CGAGCAAGTT
601  ATCTTTGGCA CCCAGGGTCA GACCTTGACC ATCAAGCAGG ACTCCTATGA
651  TCGCAACTCA TTTGCACCAG GTGTCTTGGT GGGTGTGCGC AACATTGCAC
701  AGCACCCAGG CCTAGTCGTA GGACTTGAGC ATTACCTAGG CCTGTAA
```

FIG. 8

Appl. No. 09/722,441; Group Art Unit: 1645
Dkt. No. 1533.1030002; Batch No.: To Be Assigned
Inventor(s): Hanke et al. ; Tel: 202/371-2600
Title: Increased Lysine Production by Gene Amplification

Amino acid sequence of dapB (SEQ ID NO:8)

```
    ATGGGAATCAAGGTTGGCGTTCTCGGAGCCAAAGGCCGTGTTGGTCAAACTATTGTGGCA
  1 ---------+---------+---------+---------+---------+---------+ 60

    M  G  I  K  V  G  V  L  G  A  K  G  R  V  G  Q  T  I  V  A

    GCAGTCAATGAGTCCGACGATCTGGAGCTTGTTGCAGAGATCGGCGTCGACGATGATTTG
 61 ---------+---------+---------+---------+---------+---------+ 120

    A  V  N  E  S  D  D  L  E  L  V  A  E  I  G  V  D  D  D  L

    AGCCTTCTGGTAGACAACGGCGCTGAAGTTGTCGTTGACTTCACCACTCCTAACGCTGTG
121 ---------+---------+---------+---------+---------+---------+ 180

    S  L  L  V  D  N  G  A  E  V  V  V  D  F  T  T  P  N  A  V

    ATGGGCAACCTGGAGTTCTGCATCAACAACGGCATTTCTGCGGTTGTTGGAACCACGGGC
181 ---------+---------+---------+---------+---------+---------+ 240

    M  G  N  L  E  F  C  I  N  N  G  I  S  A  V  V  G  T  T  G

    TTCGATaATGCTCGTTTGGAGCAGGTTCGCGcCTGGCTTGAAGGAAAAGACAATGTCGGT
241 ---------+---------+---------+---------+---------+---------+ 300

    F  D  N  A  R  L  E  Q  V  R  A  W  L  E  G  K  D  N  V  G

    GTTCTGATCGCACCTAACTTTGCTATCTCTGCGGTGTTGACCATGGTCTTTTCCAAGCAG
301 ---------+---------+---------+---------+---------+---------+ 360

    V  L  I  A  P  N  F  A  I  S  A  V  L  T  M  V  F  S  K  Q

    GCTGCCCGCTTCTTCGAATCAGCTGAAGTTATTGAGCTGCACCACCCCAACAAGCTGGAT
361 ---------+---------+---------+---------+---------+---------+ 420

    A  A  R  F  F  E  S  A  E  V  I  E  L  H  H  P  N  K  L  D
```

FIG.9A

Appl. No. 09/722,441; Group Art Unit: 1645
Dkt. No. 1533.1030002; Batch No.: To Be Assigned
Inventor(s): Hanke et al. ; Tel: 202/371-2600
Title: Increased Lysine Production by Gene Amplification

```
    GCACCTTCAGGCACCGCGATCCACACTGCTCAGGGCATTGCTGCGGCACGCAAAGAAGCA
421 ---------+---------+---------+---------+---------+---------+ 480

    A  P  S  G  T  A  I  H  T  A  Q  G  I  A  A  A  R  K  E  A

    GGCATGGACGCACAGCCAGATGCGACCGAGCAGGCACTTGAGGGTTCCCGTGGCGCAAGC
481 ---------+---------+---------+---------+---------+---------+ 540

    G  M  D  A  Q  P  D  A  T  E  Q  A  L  E  G  S  R  G  A  S

    GTAGATGGAATCCCaGTTCAcGCAGTCCGCATGTCCGGCATGGTTGCTCACGAGCAAGTT
541 ---------+---------+---------+---------+---------+---------+ 600

    V  D  G  I  P  V  H  A  V  R  M  S  G  M  V  A  H  E  Q  V

    ATCTTTGGCACCCAGGGTCAGACCTTGACCATCAAGCAGGACTCCTATGATCGCAACTCA
601 ---------+---------+---------+---------+---------+---------+ 660

    I  F  G  T  Q  G  Q  T  L  T  I  K  Q  D  S  Y  D  R  N  S

    TTTGCACCAGGTGTCTTGGTGGGTGTGCGCAACATTGCACAGCACCCAGGCCTAGTCGTA
661 ---------+---------+---------+---------+---------+---------+ 720

    F  A  P  G  V  L  V  G  V  R  N  I  A  Q  H  P  G  L  V  V

    GGACTTGAGCATTACCTAGGCCTGTAA
721 ---------+---------+------- 747

    G  L  E  H  Y  L  G  L  *
```

FIG.9B

Appl. No. 09/722,441; Group Art Unit: 1645
Dkt. No. 1533.1030002; Batch No.: To Be Assigned
Inventor(s): Hanke et al. ; Tel: 202/371-2600
Title: Increased Lysine Production by Gene Amplification

Nucleotide sequence of ddh (SEQ ID NO:9)

```
   1  ATGCATTTCG GTAAGCTCGA CCAGGACAGT GCCACCACAA TTTTGGAGGA
  51  TTACAAGAAC ATGACCAACA TCCGCGTAGC TATCGTaGGC TACGGAAACC
 101  TGGGACGCAG CGTCGAAAAG CTTATTGCCA AGCAGCCCGA CATGGACCTT
 151  GTAGGAATCT TCTCGCGCCG GGCCACCCTC GACACAAAGA CGCCAGTCTT
 201  TGATGTCGCC GACGTGGACA AGCACGCCGA CGACGTGGAC GTGCTGTTCC
 251  TGTGCATGGG CTCCGCCACC GACATCCCTG AGCAGGCACC AAAGTTCGCG
 301  CAGTTCGCCT GCACCGTAGA CACCTACGAC AACCACCGCG ACATCCCACG
 351  CCACCGCCAG GTCATGAACG AAGCCGCCAC CGCAGCCGGC AACGTTGCAC
 401  TGGTCTCTAC CGGCTGGGAT CCAGGAATGT TCTCCATCAA CCGCGTCTAC
 451  GCAGCGGCAG TCTTAGCCGA GCACCAGCAG CACACCTTCT GGGGCCCAGG
 501  TTTGTCACAG GGCCACTCCG ATGCTTTGCG ACGCATCCCT GGCGTTCAAA
 551  AGGCcGTCCA GTACACCCTC CCATCCGAAG AaGCCCTGGA AAAGGCCCGC
 601  CGTGGCGAAG CCGGCGACCT cACCGGAAAG CAAACCCACA AGCGCCAATG
 651  CTTCGTGGTT GCCGACGCGG CCGAcCACGA GCGCATCGAA AACGACATCC
 701  GCACCATGCC TGATTACTTC GTTGGCTACG AAGTCGAAGT CAACTTCATC
 751  GACGAAGCAA CCTTgGACgC CGAGCACACC GGCATGCCAC ACGGcGGaCA
 801  CGTGATcACC ACCGGCGACA CCGGTGGCTT CAACCACACC GTGGAATACA
 851  TCCTgAAGCT GGACCGAAAC CCAGATTTCA CCGCTTCtTC ACAGATCGCT
 901  TTCGGcCGCG CAGCTCACCG CATGAAGCAG CAGGGCCAAA GCGGtGCTTT
 951  CACCGTCCTC GAAGTTGCTC CATACtTGCT CTCCCCgGAG AACTTGGAtG
1001  ATCTGATCGC ACGCGACGTC TAA
```

FIG. 10

Appl. No. 09/722,441; Group Art Unit: 1645
Dkt. No. 1533.1030002; Batch No.: To Be Assigned
Inventor(s): Hanke et al. ; Tel: 202/371-2600
Title: Increased Lysine Production by Gene Amplification

Amino acid sequence of ddh (SEQ ID NO:10)

```
   ATGCATTTCGGTAAGCTCGACCAGGACAGTGCCACCACAATTTTGGAGGATTACAAGAAC
 1 ---------+---------+---------+---------+---------+---------+ 60

   M  H  F  G  K  L  D  Q  D  S  A  T  T  I  L  E  D  Y  K  N

   ATGACCAACATCCGCGTAGCTATCGTaGGCTACGGAAACCTGGGACGCAGCGTCGAAAAG
61 ---------+---------+---------+---------+---------+---------+ 120

   M  T  N  I  R  V  A  I  V  G  Y  G  N  L  G  R  S  V  E  K

   CTTATTGCCAAGCAGCCCGACATGGACCTTGTAGGAATCTTCTCGCGCCGGGCCACCCTC
121 ---------+---------+---------+---------+---------+---------+ 180

   L  I  A  K  Q  P  D  M  D  L  V  G  I  F  S  R  R  A  T  L

   GACACAAAGACGCCAGTCTTTGATGTCGCCGACGTGGACAAGCACGCCGACGACGTGGAC
181 ---------+---------+---------+---------+---------+---------+ 240

   D  T  K  T  P  V  F  D  V  A  D  V  D  K  H  A  D  D  V  D

   GTGCTGTTCCTGTGCATGGGCTCCGCCACCGACATCCCTGAGCAGGCACCAAAGTTCGCG
241 ---------+---------+---------+---------+---------+---------+ 300

   V  L  F  L  C  M  G  S  A  T  D  I  P  E  Q  A  P  K  F  A

   CAGTTCGCCTGCACCGTAGACACCTACGACAACCACCGCGACATCCCACGCCACCGCCAG
301 ---------+---------+---------+---------+---------+---------+ 360

   Q  F  A  C  T  V  D  T  Y  D  N  H  R  D  I  P  R  H  R  Q

   GTCATGAACGAAGCCGCCACCGCAGCCGGCAACGTTGCACTGGTCTCTACCGGCTGGGAT
361 ---------+---------+---------+---------+---------+---------+ 420

   V  M  N  E  A  A  T  A  A  G  N  V  A  L  V  S  T  G  W  D

   CCAGGAATGTTCTCCATCAACCGCGTCTACGCAGCGGCAGTCTTAGCCGAGCACCAGCAG
421 ---------+---------+---------+---------+---------+---------+ 480

   P  G  M  F  S  I  N  R  V  Y  A  A  A  V  L  A  E  H  Q  Q

   CACACCTTCTGGGGCCCAGGTTTGTCACAGGGCCACTCCGATGCTTTGCGACGCATCCCT
481 ---------+---------+---------+---------+---------+---------+ 540

   H  T  F  W  G  P  G  L  S  Q  G  H  S  D  A  L  R  R  I  P
```

FIG.11A

Appl. No. 09/722,441; Group Art Unit: 1645
Dkt. No. 1533.1030002; Batch No.: To Be Assigned
Inventor(s): Hanke et al. ; Tel: 202/371-2600
Title: Increased Lysine Production by Gene Amplification

```
    GGCGTTCAAAAGGCcGTCCAGTACACCCTCCCATCCGAAGAaGCCCTGGAAAAGGCCCGC
541 ---------+---------+---------+---------+---------+---------+ 600

    G  V  Q  K  A  V  Q  Y  T  L  P  S  E  E  A  L  E  K  A  R

    CGTGGCGAAGCCGGCGACCTcACCGGAAAGCAAACCCACAAGCGCCAATGCTTCGTGGTT
601 ---------+---------+---------+---------+---------+---------+ 660

    R  G  E  A  G  D  L  T  G  K  Q  T  H  K  R  Q  C  F  V  V

    GCCGACGCGGCCGAcCACGAGCGCATCGAAAACGACATCCGCACCATGCCTGATTACTTC
661 ---------+---------+---------+---------+---------+---------+ 720

    A  D  A  A  D  H  E  R  I  E  N  D  I  R  T  M  P  D  Y  F

    GTTGGCTACGAAGTCGAAGTCAACTTCATCGACGAAGCAACCTTgGACgCCGAGCACACC
721 ---------+---------+---------+---------+---------+---------+ 780

    V  G  Y  E  V  E  V  N  F  I  D  E  A  T  L  D  A  E  H  T

    GGCATGCCACACGGcGGaCACGTGATcACCACCGGCGACACCGGTGGCTTCAACCACACC
781 ---------+---------+---------+---------+---------+---------+ 840

    G  M  P  H  G  G  H  V  I  T  T  G  D  T  G  G  F  N  H  T

    GTGGAATACATCCTgAAGCTGGACCGAAACCCAGATTTCACCGCTTCtTCACAGATCGCT
841 ---------+---------+---------+---------+---------+---------+ 900

    V  E  Y  I  L  K  L  D  R  N  P  D  F  T  A  S  S  Q  I  A
    TTCGGcCGCGCAGCTCACCGCATGAAGCAGCAGGGCCAAAGCGGtGCTTTCACCGTCCTC
901 ---------+---------+---------+---------+---------+---------+ 960

    F  G  R  A  A  H  R  M  K  Q  Q  G  Q  S  G  A  F  T  V  L

    GAAGTTGCTCCATACtTGCTCTCCCCgGAGAACTTGGAtGATCTGATCGCACGCGACGTC
961 ---------+---------+---------+---------+---------+---------+ 1020

    E  V  A  P  Y  L  L  S  P  E  N  L  D  D  L  I  A  R  D  V

    TAA
1021 --- 1023
```

FIG.11B

Appl. No. 09/722,441; Group Art Unit: 1645
Dkt. No. 1533.1030002; Batch No.: To Be Assigned
Inventor(s): Hanke et al. ; Tel: 202/371-2600
Title: Increased Lysine Production by Gene Amplification

Sequence of full length LysA from NRRL B-11474 (SEQ ID NO: 11);
Underlined region: the priming site for lysA primer

ATGGCTACAGTTGAAAATTTCAATGAACTTCCCGCACACGTATGGCCACGCAATGCAGTG
CGCCAAGAAGACGGCGTTGTCACCGTCGCTGGTGTGCCTCTGCCTGACCTCGCTGAAGAA
TACGGAACCCCACTGTTCGTAGTCGACGAGGACGATTTCCGTTCCCGCTGTCGCGACATG
GCTACCGCATTCGGTGGACCAGGCAATGTGCACTACGCATCCAAAGCGTTCCTGACCAAG
ACCATTGCACGTTGGGTTGATGAAGAGGGGCTGGCACTGGACATTGCGTCCATCAATGAA
CTGGGCATTGCCCTGGCCGCTGGTTTCCCGGCCAGCCGTATCACCGCGCACGGCAACAAC
AAAGGCGTAGAGTTCCTGCGCGCGTTGGTTCAAAACGGTGTCGGGCATGTGGTGCTGGAC
TCCGCGCAGGAATTGGAACTGCTGGATTACGTTGCCGCTGGTGAAGGCAAGATCCAGGAC
GTGTTGATCCGCGTGAAGCCAGGTATCGAAGCCCACACCCACGAGTTCATCGCCACTAGC
CACGAAGACCAGAAGTTCGGATTCTCCCTGGCATCCGGTTCCGCATTCGAAGCAGCGAAA
GCAGCCAACAATGCAGAGAACTTGAACCTGGTTGGTCTGCACTGCCATGTTGGTTCCCAG
GTGTTCGACGCCGAAGGCTTCAAGCTGGCAGCAGAGCGCGTGTTGGGCCTGTACTCACAG
ATCCACAGCGAACTAGGTGTCGCCCTTCCTGAGCTGGACCTCGGTGGCGGATACGGCATC
GCCTACACTGCAGATGAGGAACCACTCAACGTCGCAGAAGTCGCCTCCGACCTACTCACC
GCAGTCGGAAAAATGGCAGCGGAACTAGGCATCGACGCACCAACCGTGCTTGTTGAGCCC
GGCCGCGCTATCGCAGGCCCCTCCACCGTGACCATCTACGAAGTCGGCACCACCAAAAAC
GTCCACGTAGACGACGACAAAACCCGCCGCTACGTAGCCGTCGACGGAGGCATGTCCGAC
AACATCCGCCCAGCACTCTACGGCTCCGAATACGACGCCCGCGTAGTATCCCGCTTCGCC
GAAGGAGACCCAGTAAGCACCCGCATCGTGGGCTCCCACTGCGAATCCGGCGATATCCTG
ATCAACGATGAAATCTACCCATCTGACATCACCAGCGGCGACTTCCTCGCACTCGCAGCC
ACCGGCGCATACTGCTACGCCATGAGCTCCCGCTACAACGCCTTCACACGGCCCGCCGTC
GTGTCCGTCCGCGCTGGCAGCTCCCGCCTCATGCTGCGCCGCGAAACCCTCGACGACATC
CTCTCACTAGAGGCATAA

FIG.12

Appl. No. 09/722,441; Group Art Unit: 1645
Dkt. No. 1533.1030002; Batch No.: To Be Assigned
Inventor(s): Hanke et al. ; Tel: 202/371-2600
Title: Increased Lysine Production by Gene Amplification

Full length sequence of LysA (NRRL-B11474)
DIAMINOPIMELATE DECARBOXYLASE (Lys A) (SEQ ID NO:12)

MATVENFNELPAHVWPRNAVRQEDGVVTVAGVPLPDLAEEYGTPLFVVDEDDFRSRCRDM
ATAFGGPGNVHYASKAFLTKTIARWVDEEGLALDIASINELGIALAAGFPASRITAHGNN
KGVEFLRALVQNGVGHVVLDSAQELELLDYVAAGEGKIQDVLIRVKPGIEAHTHEFIATS
HEDQKFGFSLASGSAFEAAKAANNAENLNLVGLHCHVGSQVFDAEGFKLAAERVLGLYSQ
IHSELGVALPELDLGGGYGIAYTADEEPLNVAEVASDLLTAVGKMAAELGIDAPTVLVEP
GRAIAGPSTVTIYEVGTTKNVHVDDDKTRRYVAVDGGMSDNIRPALYGSEYDARVVSRFA
EGDPVSTRIVGSHCESGDILINDEIYPSDITSGDFLALAATGAYCYAMSSRYNAFTRPAV
VSVRAGSSRLMLRRETLDDILSLEA

Sub B21

FIG. 13

Appl. No. 09/722,441; Group Art Unit: 1645
Dkt. No. 1533.1030002; Batch No.: To Be Assigned
Inventor(s): Hanke et al. ; Tel: 202/371-2600
Title: Increased Lysine Production by Gene Amplification

Nucleotide sequence of AS019 lysA (SEQ ID NO:13) (pRS6)

```
   1  ATGGCTACAG TTGAAAATTT CAATGAACTT CCCGCACACG TATGGCCACG
  51  CAATGCCGTG CGCCAAGAAG ACGGCGTTGT CACCGTCGCT GGTGTGCCTC
 101  TGCCTGACCT CGCTGAAGAA TACGGAACCC CACTGTTCGT AGTCGACGAG
 151  GACGATTTCC GTTCCCGCTG TCGCGACATG GCTACCGCAT TCGGTGGACC
 201  AGGCAATGTG CACTACGCAT CTAAAGCGTT CCTGACCAAG ACCATTGCAC
 251  GTTGGGTTGA TGAAGAGGGG CTGGCACTGG ACATTGCATC CATCAACGAA
 301  CTGGGCATTG CCCTGGCCGC TGGTTTCCCC GCCAGCCGTA TCACCGCGCA
 351  CGGCAACAAC AAAGGCGTAG AGTTCCTGCG CGCGTTGGTT CAAAACGGTG
 401  TGGGACACGT GGTGCTGGAC TCCGCACAGG AACTAGAACT GTTGGATTAC
 451  GTTGCCGCTG GTGAAGGCAA GATTCAGGAC GTGTTGATCC GCGTAAAGCC
 501  AGGCATCGAA GCACACACCC ACGAGTTCAT CGCCACTAGC CACGAAGACC
 551  AGAAGTTCGG ATTCTCCCTG GCATCCGGTT CCGCATTCGA AGCAGCAAAA
 601  GCCGCCAACA ACGCAGAAAA CCTGAACCTG GTTGGCCTGC ACTGCCACGT
 651  TGGTTCCCAG GTGTTCGACG CCGAAGGCTT CAAGCTGGCA GCAGAACGCG
 701  TGTTGGGCCT GTACTCACAG ATCCACAGCG AACTGGGCGT TGCCCTTCCT
 751  GAACTGGATC TCGGTGGCGG ATACGGCATT GCCTATACCG CAGCTGAAGA
 801  ACCACTCAAC GTCGCAGAAG TTGCCTCCGA CCTGCTCACC GCAGTCGGAA
 851  AAATGGCAGC GGAACTAGGC ATCGACGCAC CAACCGTGCT TGTTGAGCCC
 901  GGCCGCGCTA TCGCAGGCCC CTCCACCGTG ACCATCTACG AAGTCGGCAC
 951  CACCAAAGAC GTCCACGTAG ACGACGACAA AACCCGCCGT TACATCGCCG
1001  TGGACGGAGG CATGTCCGAC AACATCCGCC CAGCACTCTA CGGCTCCGAA
1051  TACGACGCCC GCGTAGTATC CCGCTTCGCC GAAGGAGACC CAGTAAGCAC
1101  CCGCATCGTG GGCTCCCACT GCGAATCCGG CGATATCCTG ATCAACGATG
1151  AAATCTACCC ATCTGACATC ACCAGCGGCG ACTTCCTTGC ACTCGCAGCC
1201  ACCGGCGCAT ACTGCTACGC CATGAGCTCC CGCTACAACG CCTTCACACG
1251  GCCCGCCGTC GTGTCCGTCC GCGCTGGCAG CTCCCGCCTC ATGCTGCGCC
1301  GCGAAACGCT CGACGACATC CTCTCACTAG AGGCATAA
```

FIG.14

Appl. No. 09/722,441; Group Art Unit: 1645
Dkt. No. 1533.1030002; Batch No.: To Be Assigned
Inventor(s): Hanke et al. ; Tel: 202/371-2600
Title: Increased Lysine Production by Gene Amplification

Full length amino acid sequence of lysA (pRS6)(SEQ ID NO:14)

```
   ATGGCTACAGTTGAAAATTTCAATGAACTTCCCGCACACGTATGGCCACGCAATGCCGTG
 1 ---------+---------+---------+---------+---------+---------+ 60

   M  A  T  V  E  N  F  N  E  L  P  A  H  V  W  P  R  N  A  V

   CGCCAAGAAGACGGCGTTGTCACCGTCGCTGGTGTGCCTCTGCCTGACCTCGCTGAAGAA
61 ---------+---------+---------+---------+---------+---------+ 120

   R  Q  E  D  G  V  V  T  V  A  G  V  P  L  P  D  L  A  E  E

   TACGGAACCCCACTGTTCGTAGTCGACGAGGACGATTTCCGTTCCCGCTGTCGCGACATG
121 ---------+---------+---------+---------+---------+---------+ 180

   Y  G  T  P  L  F  V  V  D  E  D  D  F  R  S  R  C  R  D  M

   GCTACCGCATTCGGTGGACCAGGCAATGTGCACTACGCATCTAAAGCGTTCCTGACCAAG
181 ---------+---------+---------+---------+---------+---------+ 240

   A  T  A  F  G  G  P  G  N  V  H  Y  A  S  K  A  F  L  T  K

   ACCATTGCACGTTGGGTTGATGAAGAGGGGCTGGCACTGGACATTGCATCCATCAACGAA
241 ---------+---------+---------+---------+---------+---------+ 300

   T  I  A  R  W  V  D  E  E  G  L  A  L  D  I  A  S  I  N  E

   CTGGGCATTGCCCTGGCCGCTGGTTTCCCCGCCAGCCGTATCACCGCGCACGGCAACAAC
301 ---------+---------+---------+---------+---------+---------+ 360

   L  G  I  A  L  A  A  G  F  P  A  S  R  I  T  A  H  G  N  N

   AAAGGCGTAGAGTTCCTGCGCGCGTTGGTTCAAAACGGTGTGGGACACGTGGTGCTGGAC
361 ---------+---------+---------+---------+---------+---------+ 420

   K  G  V  E  F  L  R  A  L  V  Q  N  G  V  G  H  V  V  L  D

   TCCGCACAGGAACTAGAACTGTTGGATTACGTTGCCGCTGGTGAAGGCAAGATTCAGGAC
421 ---------+---------+---------+---------+---------+---------+ 480

   S  A  Q  E  L  E  L  L  D  Y  V  A  A  G  E  G  K  I  Q  D
```

FIG.15A

Appl. No. 09/722,441; Group Art Unit: 1645
Dkt. No. 1533.1030002; Batch No.: To Be Assigned
Inventor(s): Hanke et al. ; Tel: 202/371-2600
Title: Increased Lysine Production by Gene Amplification

```
    GTGTTGATCCGCGTAAAGCCAGGCATCGAAGCACACACCCACGAGTTCATCGCCACTAGC
481 ---------+---------+---------+---------+---------+---------+ 540

    V  L  I  R  V  K  P  G  I  E  A  H  T  H  E  F  I  A  T  S

    CACGAAGACCAGAAGTTCGGATTCTCCCTGGCATCCGGTTCCGCATTCGAAGCAGCAAAA
541 ---------+---------+---------+---------+---------+---------+ 600

    H  E  D  Q  K  F  G  F  S  L  A  S  G  S  A  F  E  A  A  K

    GCCGCCAACAACGCAGAAAACCTGAACCTGGTTGGCCTGCACTGCCACGTTGGTTCCCAG
601 ---------+---------+---------+---------+---------+---------+ 660

    A  A  N  N  A  E  N  L  N  L  V  G  L  H  C  H  V  G  S  Q

    GTGTTCGACGCCGAAGGCTTCAAGCTGGCAGCAGAACGCGTGTTGGGCCTGTACTCACAG
661 ---------+---------+---------+---------+---------+---------+ 720

    V  F  D  A  E  G  F  K  L  A  A  E  R  V  L  G  L  Y  S  Q

    ATCCACAGCGAACTGGGCGTTGCCCTTCCTGAACTGGATCTCGGTGGCGGATACGGCATT
721 ---------+---------+---------+---------+---------+---------+ 780

    I  H  S  E  L  G  V  A  L  P  E  L  D  L  G  G  G  Y  G  I

    GCCTATACCGCAGCTGAAGAACCACTCAACGTCGCAGAAGTTGCCTCCGACCTGCTCACC
781 ---------+---------+---------+---------+---------+---------+ 840

    A  Y  T  A  A  E  E  P  L  N  V  A  E  V  A  S  D  L  L  T

    GCAGTCGGAAAAATGGCAGCGGAACTAGGCATCGACGCACCAACCGTGCTTGTTGAGCCC
841 ---------+---------+---------+---------+---------+---------+ 900

    A  V  G  K  M  A  A  E  L  G  I  D  A  P  T  V  L  V  E  P

    GGCCGCGCTATCGCAGGCCCCTCCACCGTGACCATCTACGAAGTCGGCACCACCAAAGAC
901 ---------+---------+---------+---------+---------+---------+ 960

    G  R  A  I  A  G  P  S  T  V  T  I  Y  E  V  G  T  T  K  D
```

FIG.15B

Appl. No. 09/722,441; Group Art Unit: 1645
Dkt. No. 1533.1030002; Batch No.: To Be Assigned
Inventor(s): Hanke et al. ; Tel: 202/371-2600
Title: Increased Lysine Production by Gene Amplification

```
    GTCCACGTAGACGACGACAAAACCCGCCGTTACATCGCCGTGGACGGAGGCATGTCCGAC
961 ---------+---------+---------+---------+---------+---------+ 1020

    V  H  V  D  D  D  K  T  R  R  Y  I  A  V  D  G  G  M  S  D

    AACATCCGCCCAGCACTCTACGGCTCCGAATACGACGCCCGCGTAGTATCCCGCTTCGCC
1021 ---------+---------+---------+---------+---------+---------+ 1080

    N  I  R  P  A  L  Y  G  S  E  Y  D  A  R  V  V  S  R  F  A

    GAAGGAGACCCAGTAAGCACCCGCATCGTGGGCTCCCACTGCGAATCCGGCGATATCCTG
1081 ---------+---------+---------+---------+---------+---------+ 1140

    E  G  D  P  V  S  T  R  I  V  G  S  H  C  E  S  G  D  I  L

    ATCAACGATGAAATCTACCCATCTGACATCACCAGCGGCGACTTCCTTGCACTCGCAGCC
1141 ---------+---------+---------+---------+---------+---------+ 1200

    I  N  D  E  I  Y  P  S  D  I  T  S  G  D  F  L  A  L  A  A

    ACCGGCGCATACTGCTACGCCATGAGCTCCCGCTACAACGCCTTCACACGGCCCGCCGTC
1201 ---------+---------+---------+---------+---------+---------+ 1260

    T  G  A  Y  C  Y  A  M  S  S  R  Y  N  A  F  T  R  P  A  V

    GTGTCCGTCCGCGCTGGCAGCTCCCGCCTCATGCTGCGCCGCGAAACGCTCGACGACATC
1261 ---------+---------+---------+---------+---------+---------+ 1320

    V  S  V  R  A  G  S  S  R  L  M  L  R  R  E  T  L  D  D  I

    CTCTCACTAGAGGCATAA
1321 ---------+--------- 1338

    L  S  L  E  A  *
```

FIG.15C

Appl. No. 09/722,441; Group Art Unit: 1645
Dkt. No. 1533.1030002; Batch No.: To Be Assigned
Inventor(s): Hanke et al. ; Tel: 202/371-2600
Title: Increased Lysine Production by Gene Amplification

Nucleotide sequence of orf2 in dapBA operon (SEQ ID NO:15)

```
  1  GTGGCCGAAC AAGTTAAATT GAGCGTGGAG TTGATAGCGT GCAGTTCTTT
 51  TACTCCACCC GCTGATGTTG AGTGGTCAAC TGATGTTGAG GGCGCGGAAG
101  CACTCGTCGA GTTTGCGGGT CGTGCCTGCT ACGAAACTTT TGATAAGCCG
151  AACCCTCGAA CTGCTTCCAA TGCTGCGTAT CTGCGCCACA TCATGGAAGT
201  GGGGCACACT GCTTTGCTTG AGCATGCCAA TGCCACGATG TATATCCGAG
251  GCATTTCTCG GTCCGCGACC CATGAATTGG TCCGACACCG CCATTTTTCC
301  TTCTCTCAAC TGTCTCAGCG TTTCGTGCAC AGCGGAGAAT CGGAAGTAGT
351  GGTGCCCACT CTCATCGATG AAGATCCGCA GTTGCGTGAA CTTTTCATGC
401  ACGCCATGGA TGAGTCTCGG TTCGCTTTCA ATGAGCTGCT TAATGCGCTG
451  GAAGAAAAAC TTGGCGATGA ACCGAATGCA CTTTTAAGGA AAAAGCAGGC
501  TCGTCAAGCA GCTCGCGCTG TGCTGCCCAA CGCTACAGAG TCCAGAATCG
551  TGGTGTCTGG AAACTTCCGC ACCTGGAGGC ATTTCATTGG CATGCGAGCC
601  AGTGAACATG CAGACGTCGA AATCCGCGAA GTAGCGGTAG GATGTTTAAG
651  AAAGCTGCAG GTAGCAGCGC CAACTGTTTT CGGTGATTTT GAGATTGAAA
701  CTTTGGCAGA CGGATCGCAA ATGGCAACAA GCCCGTATGT CATGGACTTT
751  TAA
```

FIG.16

Appl. No. 09/722,441; Group Art Unit: 1645
Dkt. No. 1533.1030002; Batch No.: To Be Assigned
Inventor(s): Hanke et al. ; Tel: 202/371-2600
Title: Increased Lysine Production by Gene Amplification

ORF2 amino acid sequence (SEQ ID NO:16)

```
   GTGGCCGAACAAGTTAAATTGAGCGTGGAGTTGATAGCGTGCAGTTCTTTTACTCCACCC
 1 ---------+---------+---------+---------+---------+---------+ 60

   M  A  E  Q  V  K  L  S  V  E  L  I  A  C  S  S  F  T  P  P

   GCTGATGTTGAGTGGTCAACTGATGTTGAGGGCGCGGAAGCACTCGTCGAGTTTGCGGGT
61 ---------+---------+---------+---------+---------+---------+ 120

   A  D  V  E  W  S  T  D  V  E  G  A  E  A  L  V  E  F  A  G

   CGTGCCTGCTACGAAACTTTTGATAAGCCGAACCCTCGAACTGCTTCCAATGCTGCGTAT
121 ---------+---------+---------+---------+---------+---------+ 180

   R  A  C  Y  E  T  F  D  K  P  N  P  R  T  A  S  N  A  A  Y

   CTGCGCCACATCATGGAAGTGGGGCACACTGCTTTGCTTGAGCATGCCAATGCCACGATG
181 ---------+---------+---------+---------+---------+---------+ 240

   L  R  H  I  M  E  V  G  H  T  A  L  L  E  H  A  N  A  T  M

   TATATCCGAGGCATTTCTCGGTCCGCGACCCATGAATTGGTCCGACACCGCCATTTTTCC
241 ---------+---------+---------+---------+---------+---------+ 300

   Y  I  R  G  I  S  R  S  A  T  H  E  L  V  R  H  R  H  F  S

   TTCTCTCAACTGTCTCAGCGTTTCGTGCACAGCGGAGAATCGGAAGTAGTGGTGCCCACT
301 ---------+---------+---------+---------+---------+---------+ 360

   F  S  Q  L  S  Q  R  F  V  H  S  G  E  S  E  V  V  V  P  T

   CTCATCGATGAAGATCCGCAGTTGCGTGAACTTTTCATGCACGCCATGGATGAGTCTCGG
361 ---------+---------+---------+---------+---------+---------+ 420

   L  I  D  E  D  P  Q  L  R  E  L  F  M  H  A  M  D  E  S  R
```

FIG.17A

Appl. No. 09/722,441; Group Art Unit: 1645
Dkt. No. 1533.1030002; Batch No.: To Be Assigned
Inventor(s): Hanke et al. ; Tel: 202/371-2600
Title: Increased Lysine Production by Gene Amplification

```
    TTCGCTTTCAATGAGCTGCTTAATGCGCTGGAAGAAAAACTTGGCGATGAACCGAATGCA
421 ---------+---------+---------+---------+---------+---------+ 480

    F  A  F  N  E  L  L  N  A  L  E  E  K  L  G  D  E  P  N  A

    CTTTTAAGGAAAAAGCAGGCTCGTCAAGCAGCTCGCGCTGTGCTGCCCAACGCTACAGAG
481 ---------+---------+---------+---------+---------+---------+ 540

    L  L  R  K  K  Q  A  R  Q  A  A  R  A  V  L  P  N  A  T  E

    TCCAGAATCGTGGTGTCTGGAAACTTCCGCACCTGGAGGCATTTCATTGGCATGCGAGCC
541 ---------+---------+---------+---------+---------+---------+ 600

    S  R  I  V  V  S  G  N  F  R  T  W  R  H  F  I  G  M  R  A

    AGTGAACATGCAGACGTCGAAATCCGCGAAGTAGCGGTAGGATGTTTAAGAAAGCTGCAG
601 ---------+---------+---------+---------+---------+---------+ 660

    S  E  H  A  D  V  E  I  R  E  V  A  V  G  C  L  R  K  L  Q

    GTAGCAGCGCCAACTGTTTTCGGTGATTTTGAGATTGAAACTTTGGCAGACGGATCGCAA
661 ---------+---------+---------+---------+---------+---------+ 720

    V  A  A  P  T  V  F  G  D  F  E  I  E  T  L  A  D  G  S  Q

    ATGGCAACAAGCCCGTATGTCATGGACTTTTAA
721 ---------+---------+---------+--- 753

    M  A  T  S  P  Y  V  M  D  F  *
```

FIG. 17B

Appl. No. 09/722,441; Group Art Unit: 1645
Dkt. No. 1533.1030002; Batch No.: To Be Assigned
Inventor(s): Hanke et al. ; Tel: 202/371-2600
Title: Increased Lysine Production by Gene Amplification

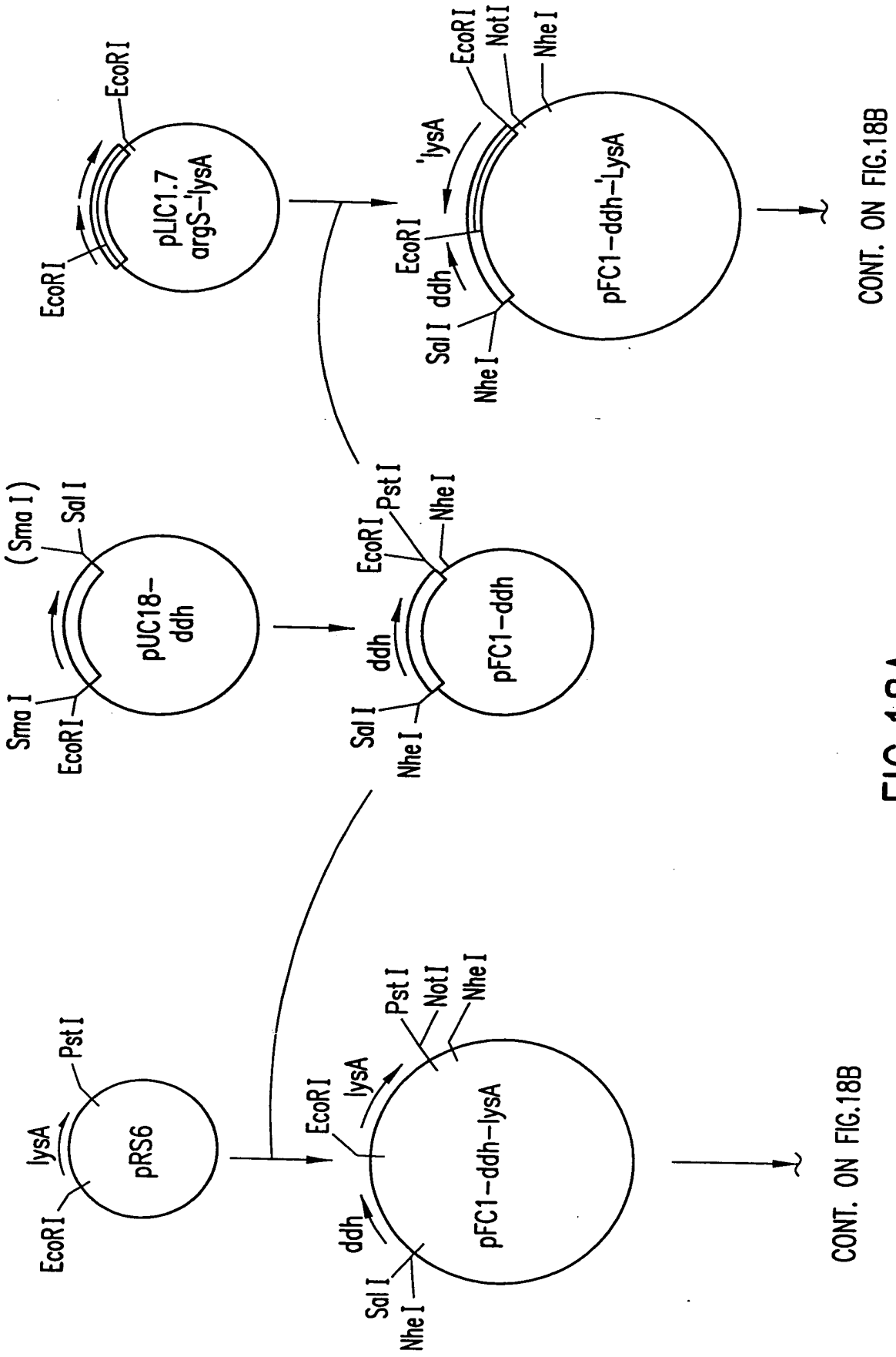

FIG.18A

Appl. No. 09/722,441; Group Art Unit: 1645
Dkt. No. 1533.1030002; Batch No.: To Be Assigned
Inventor(s): Hanke et al. ; Tel: 202/371-2600
Title: Increased Lysine Production by Gene Amplification

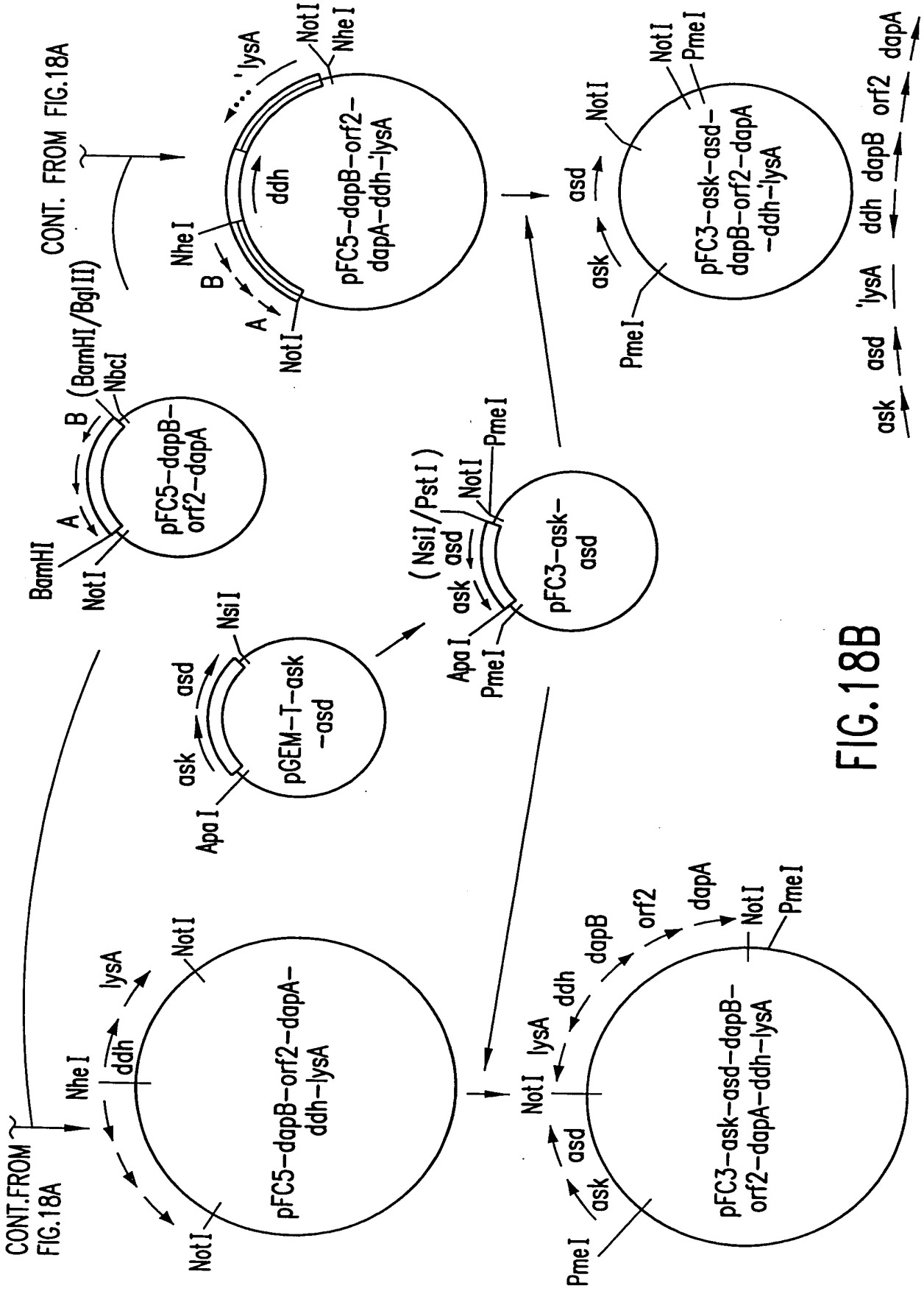

FIG.18B

Appl. No. 09/722,441; Group Art Unit: 1645
Dkt. No. 1533.1030002; Batch No.: To Be Assigned
Inventor(s): Hanke et al. ; Tel: 202/371-2600
Title: Increased Lysine Production by Gene Amplification

```
                1                                                   50
ATCC 13032                                                      V
N13                                                             C
ATCC 21529                                                      C
   Consensus    MALVVQKYGG SSLESAERIR NVAERIVATK KAGNDVVVVC SAMGDTTDEL

               51                                                  100
ATCC 13032
N13
ATCC 21529
   Consensus    LELAAAVNPV PPAREMDMLL TAGERISNAL VAMAIESLGA EAQSFTGSQA

              101                                                  150
ATCC 13032
N13
ATCC 21529
   Consensus    GVLTTERHGN ARIVDVTPGR VREALDEGKI CIVAGFQGVN KETRDVTTLG

              151                                                  200
ATCC 13032
N13
ATCC 21529
   Consensus    RGGSDTTAVA LAAALNADVC EIYSDVDGVY TADPRIVPNA QKLEKLSFEE

              201                                                  250
ATCC 13032
N13
ATCC 21529
   Consensus    MLELAAVGSK ILVLRSVEYA RAFNVPLRVR SSYSNDPGTL IAGSMEDIPV

              251                                                  300
ATCC 13032
N13
ATCC 21529
   Consensus    EEAVLTGVAT DKSEAKVTVL GISDKPGEAA KVFRALADAE INIDMVLQNV

              301                                                  350
ATCC 13032                    S                                 G
N13                           A                                 D
ATCC 21529                    A                                 G
   Consensus    SSVEDGTTDI TFTCPRADGR RAMEILKKLQ VQGNWTNVLY DDQVGKVSLV

              351                                                  400
ATCC 13032                                  T
N13                                         T
ATCC 21529                                  I
   Consensus    GAGMKSHPGV TAEFMEALRD VNVNIELIST SEIRISVLIR EDDLDAAARA

              401                 421
ATCC 13032
N13
ATCC 21529
   Consensus    LHEQFQLGGE DEAVVYAGTG R
```

FIG.19

Appl. No. 09/722,441; Group Art Unit: 1645
Dkt. No. 1533.1030002; Batch No.: To Be Assigned
Inventor(s): Hanke et al. ; Tel: 202/371-2600
Title: Increased Lysine Production by Gene Amplification

HpaI-PvuII fragment comprising the P1 promoter (SEQ ID NO:17)

AACCGGTGTGGAGCCGACCATTCCGCGAGGCTGCACTGCAACGAGGTCGTAGTTTTGGTACATGGCTTCTG
GCCAGTTCATGGATTGGCTGCCGAAGAAGCTATAGGCATCGCCACCAGGGCCACCGGAGTTACCGAAGATG
GTGCCGTGCTTTTCGCCTTGGGCAGGGACCTTGACAAAGCCCACGCTGATATCGCCAAGTGAGGGATCAGA
ATAGTGCATGGGCACGTCGATGCTGCCACATTGAGCGGAGGCAATATCTACCTGAGGTGGGCATTCTTCCC
AGCGGATGTTTTCTTGCGCTGCTGCAGTGGGCATTGATACCAAAAAGGGGCTAAGCGCAGTCGAGGCGGCA
AGAACTGCTACTACCTTTTTTATTGTCGAACGGGGCATTACGGCTCCAAGGACGTTTGTTTTCTGGGTCAG
TTACCCCAAAAAGCATATACAGAGACCAATGATTTTTCATTAAAAAGGCAGGGATTTGTTATAAGTATGGG
TCGTATTCTGTGCGACGGGTGTACCTCGGCTAGAATTTCTCCCCATGACACCAG

FIG. 20

Appl. No. 09/722,441; Group Art Unit: 1645
Dkt. No. 1533.1030002; Batch No.: To Be Assigned
Inventor(s): Hanke et al. ; Tel: 202/371-2600
Title: Increased Lysine Production by Gene Amplification

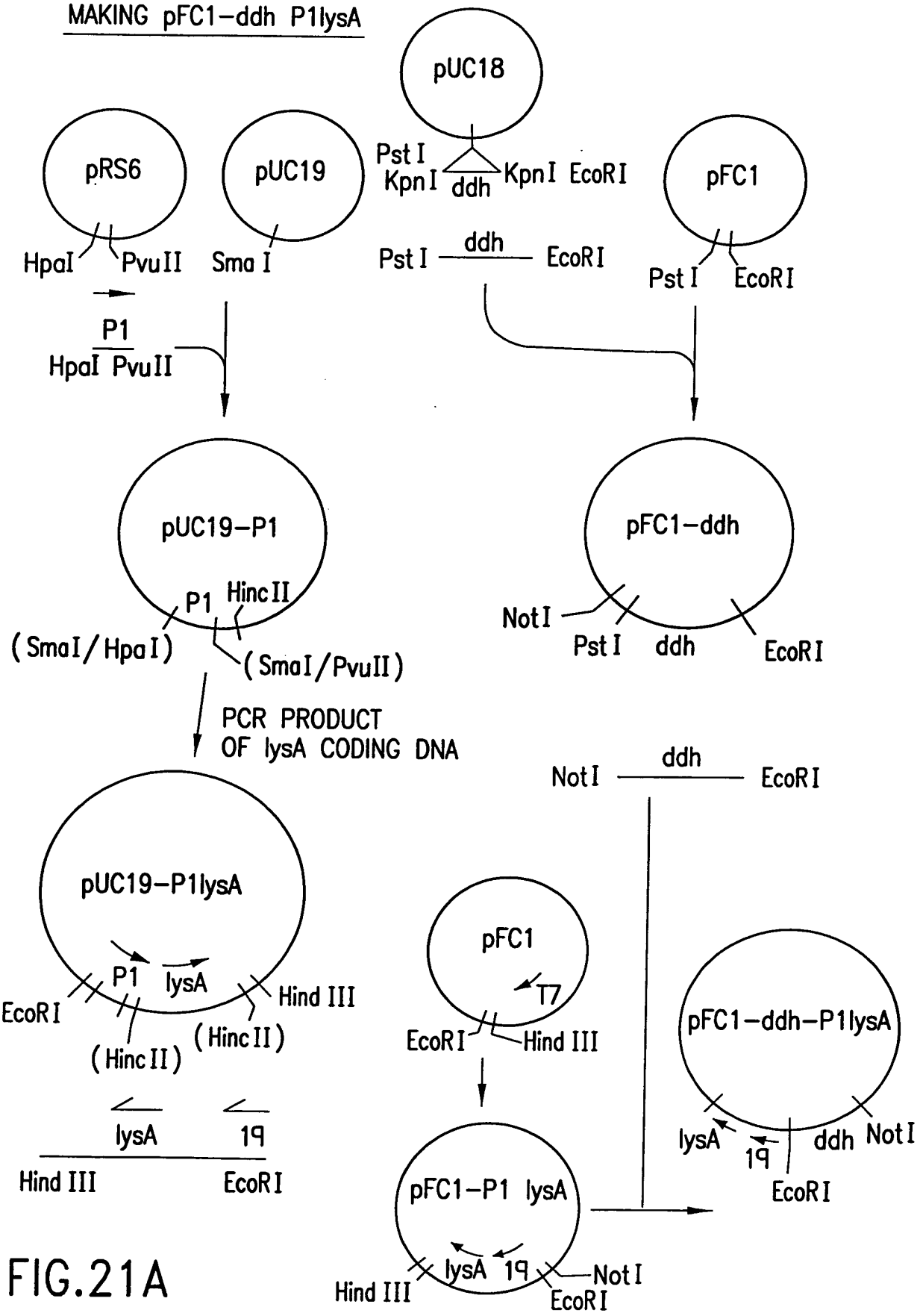

FIG.21A

Appl. No. 09/722,441; Group Art Unit: 1645
Dkt. No. 1533.1030002; Batch No.: To Be Assigned
Inventor(s): Hanke et al. ; Tel: 202/371-2600
Title: Increased Lysine Production by Gene Amplification

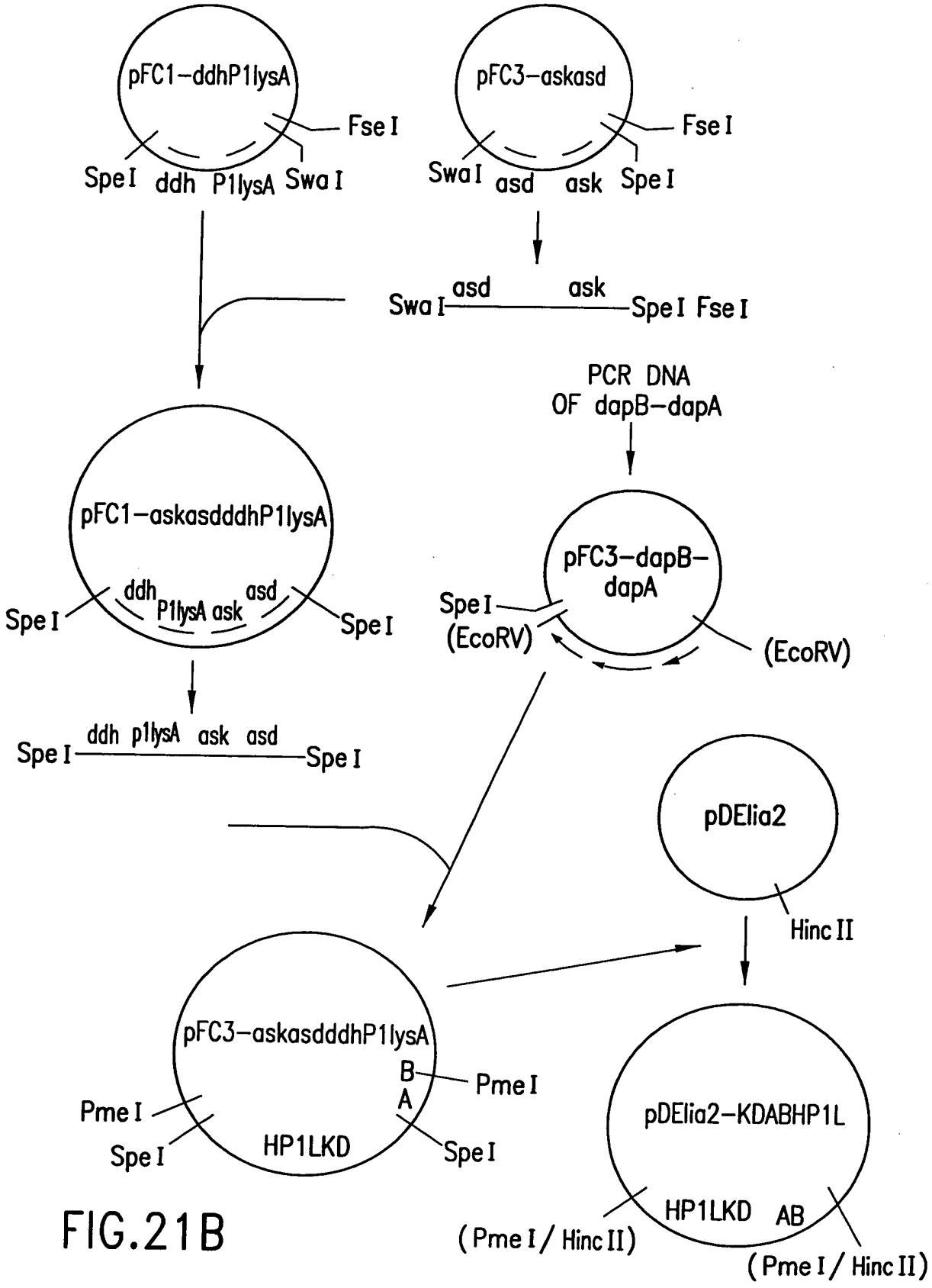

FIG.21B

Appl. No. 09/722,441; Group Art Unit: 1645
Dkt. No. 1533.1030002; Batch No.: To Be Assigned
Inventor(s): Hanke et al. ; Tel: 202/371-2600
Title: Increased Lysine Production by Gene Amplification

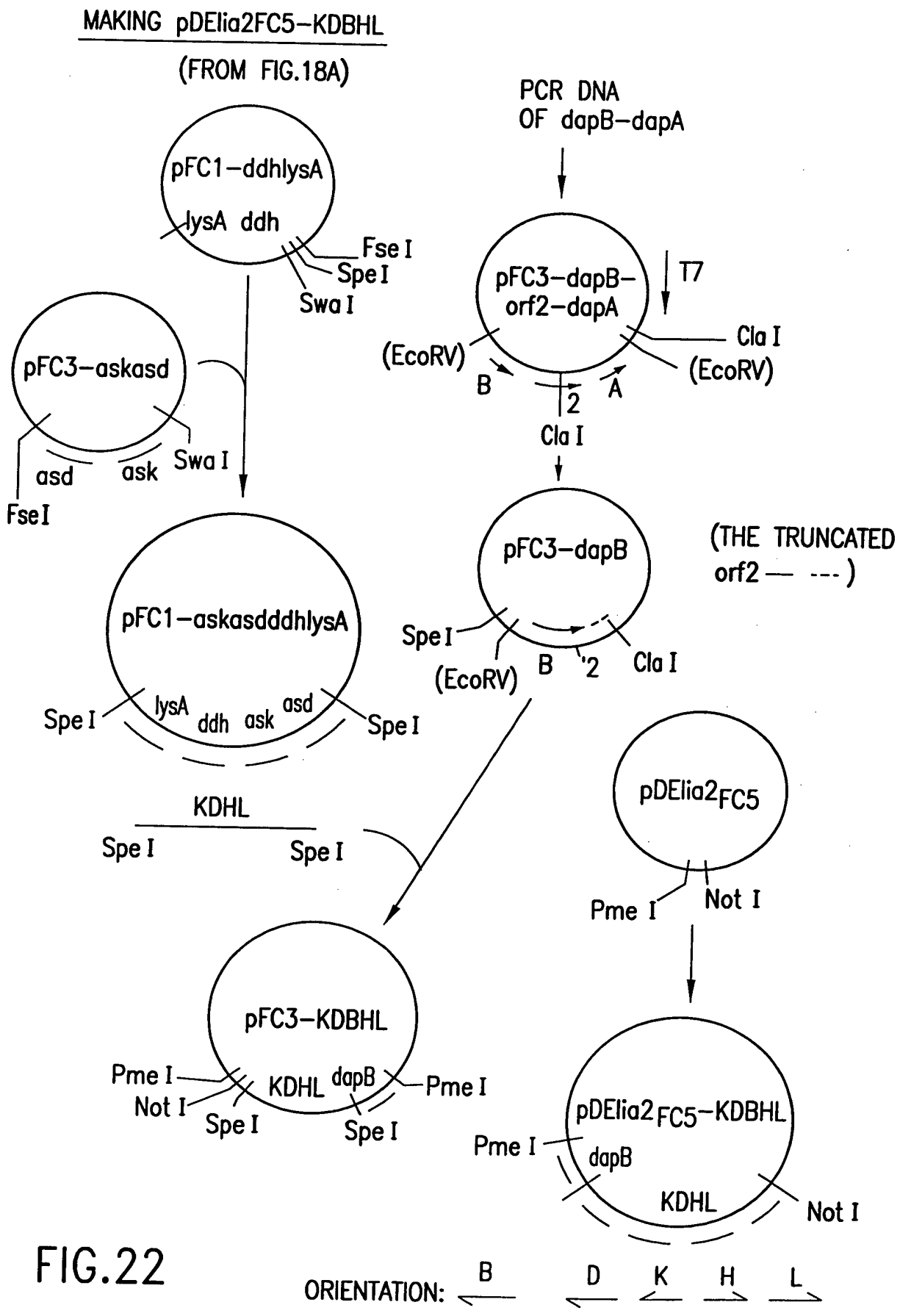

FIG.22

Appl. No. 09/722,441; Group Art Unit: 1645
Dkt. No. 1533.1030002; Batch No.: To Be Assigned
Inventor(s): Hanke et al. ; Tel: 202/371-2600
Title: Increased Lysine Production by Gene Amplification

Nucleotide sequence of truncated ORF2 (SEQ ID NO:18)

```
  1  GTGGCCGAAC AAGTTAAATT GAGCGTGGAG TTGATAGCGT GCAGTTCTTT
 51  TACTCCACCC GCTGATGTTG AGTGGTCAAC TGATGTTGAG GGCGCGGAAG
101  CACTCGTCGA GTTTGCGGGT CGTGCCTGCT ACGAAACTTT TGATAAGCCG
151  AACCCTCGAA CTGCTTCCAA TGCTGCGTAT CTGCGCCACA TCATGGAAGT
201  GGGGCACACT GCTTTGCTTG AGCATGCCAA TGCCACGATG TATATCCGAG
251  GCATTTCTCG GTCCGCGACC CATGAATTGG TCCGACACCG CCATTTTTCC
301  TTCTCTCAAC TGTCTCAGCG TTTCGTGCAC AGCGGAGAAT CGGAAGTAGT
351  GGTGCCCACT CTCAT
```

FIG. 23

Appl. No. 09/722,441; Group Art Unit: 1645
Dkt. No. 1533.1030002; Batch No.: To Be Assigned
Inventor(s): Hanke et al. ; Tel: 202/371-2600
Title: Increased Lysine Production by Gene Amplification

Truncated ORF2 amino acid sequence (SEQ ID NO:19)

```
   GTGGCCGAACAAGTTAAATTGAGCGTGGAGTTGATAGCGTGCAGTTCTTTTACTCCACCC
 1 ---------+---------+---------+---------+---------+---------+ 60

   M  A  E  Q  V  K  L  S  V  E  L  I  A  C  S  S  F  T  P  P

   GCTGATGTTGAGTGGTCAACTGATGTTGAGGGCGCGGAAGCACTCGTCGAGTTTGCGGGT
61 ---------+---------+---------+---------+---------+---------+ 120

   A  D  V  E  W  S  T  D  V  E  G  A  E  A  L  V  E  F  A  G

   CGTGCCTGCTACGAAACTTTTGATAAGCCGAACCCTCGAACTGCTTCCAATGCTGCGTAT
121 ---------+---------+---------+---------+---------+---------+ 180

   R  A  C  Y  E  T  F  D  K  P  N  P  R  T  A  S  N  A  A  Y

   CTGCGCCACATCATGGAAGTGGGGCACACTGCTTTGCTTGAGCATGCCAATGCCACGATG
181 ---------+---------+---------+---------+---------+---------+ 240

   L  R  H  I  M  E  V  G  H  T  A  L  L  E  H  A  N  A  T  M

   TATATCCGAGGCATTTCTCGGTCCGCGACCCATGAATTGGTCCGACACCGCCATTTTTCC
241 ---------+---------+---------+---------+---------+---------+ 300

   Y  I  R  G  I  S  R  S  A  T  H  E  L  V  R  H  R  H  F  S

   TTCTCTCAACTGTCTCAGCGTTTCGTGCACAGCGGAGAATCGGAAGTAGTGGTGCCCACT
301 ---------+---------+---------+---------+---------+---------+ 360

   F  S  Q  L  S  Q  R  F  V  H  S  G  E  S  E  V  V  V  P  T

   CTCAT ...
361 -----

   L (I)
```

FIG. 24

Appl. No. 09/722,441; Group Art Unit: 1645
Dkt. No. 1533.1030002; Batch No.: To Be Assigned
Inventor(s): Hanke et al. ; Tel: 202/371-2600
Title: Increased Lysine Production by Gene Amplification

Sequence of truncated LysA ('LysA) (NRRL-B11474) (SEQ ID NO:20)

ATGGCTACAGTTGAAAATTTCAATGAACTTCCCGCACACGTATGGCCACGCAATGCAGTG
CGCCAAGAAGACGGCGTTGTCACCGTCGCTGGTGTGCCTCTGCCTGACCTCGCTGAAGAA
TACGGAACCCCACTGTTCGTAGTCGACGAGGACGATTTCCGTTCCCGCTGTCGCGACATG
GCTACCGCATTCGGTGGACCAGGCAATGTGCACTACGCATCCAAAGCGTTCCTGACCAAG
ACCATTGCACGTTGGGTTGATGAAGAGGGGCTGGCACTGGACATTGCGTCCATCAATGAA
CTGGGCATTGCCCTGGCCGCTGGTTTCCCGGCCAGCCGTATCACCGCGCACGGCAACAAC
AAAGGCGTAGAGTTCCTGCGCGCGTTGGTTCAAAACGGTGTCGGGCATGTGGTGCTGGAC
TCCGCGCAGGAATTGGAACTGCTGGATTACGTTGCCGCTGGTGAAGGCAAGATCCAGGAC
GTGTTGATCCGCGTGAAGCCAGGTATCGAAGCCCACACCCACGAGTTCATCGCCACTAGC
CACGAAGACCAGAAGTTCGGATTCTCCCTGGCATCCGGTTCCGCATTCGAAGCAGCGAAA
GCAGCCAACAATGCAGAGAACTTGAACCTGGTTGGTCTGCACTGCCATGTTGGTTCCCAG
GTGTTCGACGCCGAAGGCTTCAAGCTGGCAGCAGAGCGCGTGTTGGGCCTGTACTCACAG
ATCCACAGCGAACTAGGTGTCGCCCTTCCTGAGCTGGACCTCGGTGGCGGATACGGCATC
GCCTACACTGCAGATGAGGAACCACTCAACGTCGCAGAAGTCGCCTCCGACCT

FIG. 25

Appl. No. 09/722,441; Group Art Unit: 1645
Dkt. No. 1533.1030002; Batch No.: To Be Assigned
Inventor(s): Hanke et al. ; Tel: 202/371-2600
Title: Increased Lysine Production by Gene Amplificatio

Truncated sequence of LysA (NRRL-B11474)

DIAMINOPIMELATE DECARBOXYLASE (LysA) (SEQ ID NO:21)

MATVENFNELPAHVWPRNAVRQEDGVVTVAGVPLPDLAEEYGTPLFVVDEDDFRSRCRDM
ATAFGGPGNVHYASKAFLTKTIARWVDEEGLALDIASINELGIALAAGFPASRITAHGNN
KGVEFLRALVQNGVGHVVLDSAQELELLDYVAAGEGKIQDVLIRVKPGIEAHTHEFIATS
HEDQKFGFSLASGSAFEAAKAANNAENLNLVGLHCHVGSQVFDAEGFKLAAERVLGLYSQ
IHSELGVALPELDLGGGYGIAYTADEEPLNVAEVASDL

FIG. 26